

Bulletin

No. 1 34th year

University of Toronto

Monday, July 14, 1980

Inside the Bulletin

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President James Ham, OC

President James Ham is among 64 Canadians recently appointed to the Order of Canada.

President Ham becomes an officer of the order; he and his fellow appointees will be invested during a Government House ceremony this fall.

Nominations for co-opted members of the Planning Subcommittee of the Planning & Resources Committee

Members of the University community are invited to submit nominations for co-opted membership on the Planning Subcommittee of the Planning & Resources Committee. In making its selection, the striking committee will give preference to senior academics and experienced academic administrators.

Nominations should include:

- A brief and relevant curriculum vitae
- An indication, if possible, of the nominee's willingness to serve, if selected, for more than one year.

Nominations should be sent to D. Ross Smith, Secretary, Planning & Resources Committee, Room 106, Simcoe Hall. Nominations should be in not later than Monday, July 28.

Human nutrition program receives Mead Johnson grant

The Program in Human Nutrition has received one of the two Mead Johnson Nutritional Grants awarded to universities in Canada. According to Dr. John E. Knapp, vice-president of Bristol-Myers Pharmaceutical Group in Canada, these grants are to support nutrition research and education programs. The other recipient in Canada was Claude C. Roy, director of the Pediatric Research Centre at the University of Montreal; similar grants were awarded to several universities in the United States.

The initial grant is for \$25,000. An equal amount may be available for each of two subsequent years.

Rev. W.H. Irwin to head theology at St. Mike's

Rev. William H. Irwin, CSB, associate professor, Old Testament, became dean of the Faculty of Theology, University of St. Michael's College, on July 1 for a four-year term. Father Irwin, 47, obtained an honours BA and an MA in philosophy from the University of Toronto, an STB from St. Michael's and a doctorate in biblical studies from the Pontifical Biblical Institute, Rome. He has published a book and several articles on biblical subjects. He has been on the staff of St. Michael's Faculty of Theology since 1965. For the past three years, he has been assistant director, advanced degree studies, Toronto School of Theology, of which his faculty is a member.

Father Irwin succeeds Father Elliott Allen, CSB, who has been dean since 1969. Father Allen played an important role in the formation and development of the ecumenical Toronto School of Theology. He will continue to teach at St. Michael's.

Treating mental illness in the ethnic community

U of T's transcultural psychiatric unit is often the last hope for recovery

By Sarah Henry

The Portuguese woman was brought to Toronto Western Hospital suffering what appeared to be a serious mental illness. She would tightly clasp her hands in an attitude of prayer for hours on end. And she had told her family she could communicate directly with Jesus Christ.

A Canadian-trained psychiatrist might have diagnosed her condition as schizophrenia. The religious mania, occasional catatonia, and poor links with reality all suggested an emotional disturbance that would require extensive treatment.

But U of T psychiatry professor Dr. Frederico Allodi, director of the Western's transcultural psychiatric unit recognized she was suffering from a reactive delusional psychosis, a condition rarely diagnosed in North America, but quite common among patients from Third World countries and rural European backgrounds. Within a few days of drug therapy, the woman's symptoms had lifted.

Dr. Allodi is in a unique position to treat Toronto's ethnic community. A native of Spain, he speaks five languages. And the U of T transcultural psychiatric unit is located in an area where 45 percent of the residents speak no English.

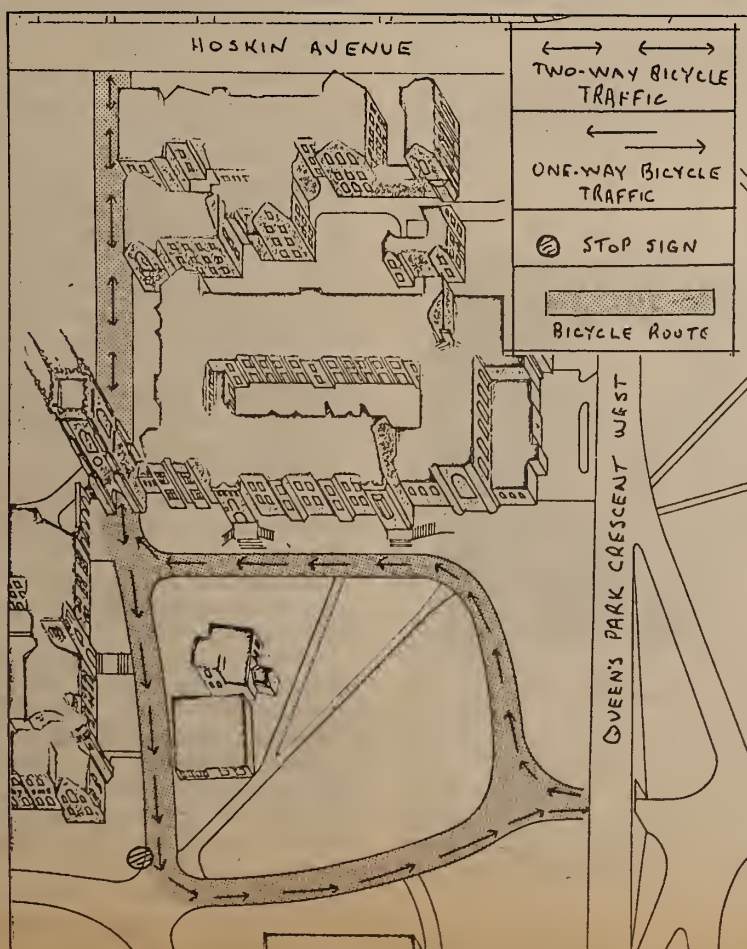
The psychiatrist tells the story of the Portuguese woman to illustrate that although the causes of mental illness are fairly universal, "the content" — the form the disturbance takes — can vary considerably among different cultures.

Continued on Page 2



In addition to language barriers and the possibility of being misdiagnosed by North American psychiatrists, immigrants and minority ethnic groups face higher than average risk of becoming mentally ill because of the pressures of adjusting to life in Canada.

City bicycle route to run through University property



The University has agreed to let the city link up its new east-west bicycle route through U of T property.

The two-year trial arrangement allows cyclists to use Hart House Circle, the Soldiers' Tower passageway and Tower Rd.

Alderman David White, chairman of the city's cycling committee, says the new route, along Wellesley, Hoskin and Harbord, will be publicized and go into service this fall. It will complement an existing north-south route along St. George St.

The arrangement with the University will allow cyclists to make the east-west connection without travelling along fast-moving Queen's Park Crescent. The city has agreed to assume liability in the event of bicycle accidents on University property.

The agreement has received approval from the Campus & Community Affairs Committee, as well as the U of T Alumni Association, which has responsibility for the Soldiers' Tower passage.

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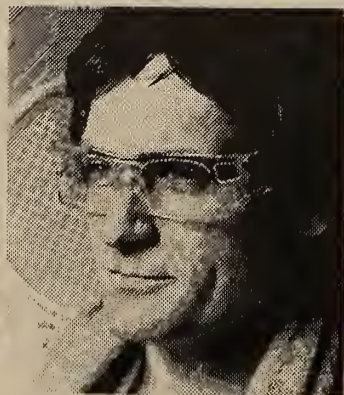
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Treating mental illness Continued from Page 1

A Canadian-born patient experiencing the same stresses as this woman, for example, might have suffered extreme depression, perhaps have attempted suicide, and probably have felt anxiety about health and body functions, he says.

Over the past three years, close to 900 patients, half of whom don't speak English, have found their way to the Western's transcultural psychiatric unit. In addition to the linguistic barriers and the possibility of being misdiagnosed by North American psychiatrists, these patients, most of whom are from Italy, Portugal and Latin America, face higher than average risk of becoming mentally ill because of the pressures of adjusting to life in Canada.

"The roots of psychiatric problems are multi-factorial, involving money, family, as well as the mental illness," says Dr. Allodi. "But because of the stresses of living in Canada and because of their status as immigrants and minority ethnic groups, these people have special needs."

It is these special needs that the transcultural psychiatric unit was set up to serve. At the weekly clinics, Dr. Allodi and a part-time public health nurse, the only professional staff members, must take on the roles of priest, social worker and community resources expert, as well as their jobs as doctor and nurse. Many of these immigrant patients have received psychiatric treatment in the past. For many, the transcultural unit represents a final hope for recovery, says the psychiatrist.

Yet conversely, because of the sense of belonging within ethnic communities, chances for recovery are perhaps better than for native-born Canadians.

"Illness is not viewed entirely as an individual matter," says Dr. Allodi. "It is conceptualized in terms of the family because it affects everyone."

"We find that people who are recovering from such an illness are immediately absorbed into the family. There doesn't seem to be a stigma in having suffered a mental illness, and so the recovery is often better. When there is an illness, everyone is concerned. When there is a cure, everyone benefits."

Treatment, like the illness itself, is also a family affair. "When they first come to the office it is often difficult to know from their behavior which is the ill person. The patient may be a sick man, but it is often his wife who is showing the signs of hysteria." Therapy, in such instances, aims at separating the people involved to give them more emotional autonomy. "The ego is the major controlling force of the psyche. But within these families, the ego is amorphous and fused," says the psychiatrist.

A relatively recent phenomenon is an increasing divorce rate, a fact of life that would have been unthinkable in the immigrant family 20 years ago. But even today, marital discord often involves more than the two principals: "The relatives in the extended family take sides," says Dr. Allodi. "If the wife refuses to put up with the antics of her husband, she is seen as betraying the traditions of the family. She is expected to suffer, or to change the situation without resorting to separation. She might find herself totally victimized by the extended family."

"And it can work the other way. If the husband isn't a good provider, then the entire family literally throws him out of the house."

"But these are extreme cases. The majority of wives manage to bring their husbands under control."

In addition to his work at the weekly clinic and referrals through other Toronto psychiatrists, Dr. Allodi has seen about 100 torture victims who are seeking entry into Canada, most of them from Latin America. He has also visited Chile, Colombia, Costa Rica and Venezuela as a consultant to Amnesty International.

He is one of a number of Toronto doctors who are active in an organization

called Psychiatrists against Psychiatric Abuse. These doctors have taken an active role in protesting the imprisonment of political prisoners on psychiatric grounds; but the aftermath of persecution and torture affecting refugees who have come to Canada has also become part of their work.

For these immigration cases, it has been Dr. Allodi's job to determine whether or not these patients are malingerers simply to get into the country. Most have been screened by lawyers prior to their visit to the transcultural unit. By the time they reach the psychiatrist, there is little likelihood of deliberate deception: "Even a consummate actor could not duplicate the human stress, the pattern of symptoms, the excruciating anguish and extreme tension," he says.

"I have been very lucky because I have not seen cases where the stories aren't true, though I think they will come eventually. I've seen two or three cases that are weak. And I've seen many cases where a person could have gone to another country but has decided on Canada because it is better. But that doesn't mean their story of persecution is untrue."

"My job is to see their symptoms are consistent with what we call gross stress reaction, which is similar to the rape victims we see in our cities, or people who have been involved in major catastrophes like explosions, earthquakes and other situations where life is threatened. In its chronic form, the symptoms are like those of the concentration camp survivors, where there is major, unthinkable stress over a long period of time."

"And, in fact, some of these victims of torture from Latin America will have patterns that are indistinguishable from concentration camp survivor syndrome."

The heavy caseload at the transcultural psychiatric unit provides evidence that a service aimed specifically at Toronto's huge immigrant population is necessary. When the unit was set up in July 1977, the plan had called for a full-time research assistant, secretary, a part-time resident, social worker or public health nurse, in addition to the director. But repeated requests for more favourable funding have been unsuccessful, he says. "I don't think this type of work has much prestige. It certainly has low political priority."

But the psychiatrist says he will continue to push for an expanded service that can provide more research and teaching directed at the emotional needs of different minority groups.

About 55 percent of the Toronto population was born outside Canada, yet students and established professionals are still not being adequately trained to treat immigrant patients or to plug into the existing network of services set up for residents from ethnic minorities, he says.

Bulletin

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Copy Editor: Margaret MacAulay

Production: Chris Johnson, Sandra Sarner

Photographer: David Lloyd

Advertising: Marion de Courcy-Ireland, 978-2106

Marketing & Advertising Sales:
Beverly Garber, 978-2106

Director: Elizabeth Wilson

Material may be reprinted in whole or in part with appropriate credit to the *Bulletin*.

Published every two weeks by the Department of Information Services, 45 Willcocks St., Toronto, Ontario M5S 1C7
Telephone 978-2102

Submissions for publication must be in the *Bulletin* office 10 days before publication date. Display advertising space must be reserved two weeks before publication date.

Trace: The ultimate test of time

Physics, archaeology and geology collaborate on the biggest science project at U of T

By Pat Ohlendorf

How long has man inhabited North America? How do valuable ore deposits form? Exactly how much pollution have our lakes, rivers and oceans suffered and which substances have been the worst offenders? How can radioactive materials be used most effectively and safely in medical research? Where should nuclear wastes be buried?

These seemingly unrelated questions may be answered by a machine that will arrive at the U of T at the end of this year. The machine — actually a chain of machines — will measure minute quantities of trace elements in natural materials, not by elaborate and sometimes uncertain methods of chemical analysis, not, in the case of carbon dating, by measuring radioactive emissions, but by actually counting the rare atoms themselves. This novel method is accomplished by hooking up a tandem accelerator to mass spectrometers and other "bits and pieces", thereby turning a nuclear physics machine into the most powerful tool for analysis in the world. It will be a thousand times more sensitive than conventional carbon-14 dating and has the potential to analyze samples for every element that exists.

The eclectic applications of the machine reflect the creative collaboration of three different University disciplines: physics, geology and archaeology. Professor Ted Litherland (physics), the prime mover of the concept, calls it "TRACE" (Tandem Rare Atom Counting Equipment); Professor David Strangway (geology), head of the project, calls it the "ultra-sensitive analysis facility" (USAF); Professor John Rucklidge (geology) refers to "the ion microprobe"; Professor William Irving (archaeology) calls it simply "the black box they're building across the street". Whatever its name will eventually be, "TRACE" is both the biggest current science project at the University (\$1,172,000 over three years) and one of a small but growing number of collaborative efforts.

The germ of the idea developed in 1974 when Litherland, a distinguished nuclear physicist with a life-long interest in archaeology, taught a joint physics and archaeology course (hence the association with Irving) and began investigating whether atom counting could improve carbon-14 dating.

In Litherland's approach, the isotope of interest, carbon-14, must be picked out from all the other atoms and molecules (the "background") in a sample — a task more rigorous than finding a needle in a million haystacks. The key lies in getting rid of the vast numbers of other particles. Litherland and his co-workers reasoned that a mass spectrometer could be used to select particles of mass 14 from a sample, thus eliminating a host of common atoms

Pat Ohlendorf is a freelance science editor and writer. This article first appeared in the U of T Graduate.



Rock close-up: Scanning electron micrograph of a 50-micron area of zircon crystal. The flat areas are the pure crystal, which can be dated by analyzing for uranium and lead; the central, bumpy area is an impurity, and would yield an inaccurate date. X's (representing spots of about 1 micron) show how TRACE can move across the sample from grain to grain to obtain an accurate measurement. (Micrograph courtesy of Tom Krogh, ROM.)



"The kid from Old Crow River," Prof. Irving's unique Pleistocene find, awaits carbon-14 dating by TRACE.

and molecules. Next, an accelerator could be used to break up the molecules of mass 14 leaving only atoms.

At this point another mass spectrometer could select for mass 14 again. But how could the carbon-14 atoms be distinguished from nitrogen-14 and counted? As nitrogen is the most common gas in the atmosphere (one carbon-14 atom occurs per 100,000,000,000 nitrogen-14 atoms in nature), the problem has been reduced to finding that needle in a field of haystacks. Litherland solved this problem by an original discovery that secured a future of fruitful collaboration between physics and archaeology. Using the tandem accelerator at Rochester, New York, Litherland bombarded a sample with positive ions before the particles entered the mass spectrometer and accelerator. He found that nitrogen-14 did not form negative ions and was left behind; everything else became negatively charged and barrelled through the machines. Now the carbon-14 atoms could be counted and compared to the numbers of carbon-12 and carbon-13 atoms in the sample (recovered from the accelerator and counted separately, hard on the heels of the carbon-14). Since these isotopic ratios decrease by half every 5,730 years (the "half-life" of carbon-14), the age of the sample could be calculated easily.

Curious whether anyone outside nuclear physics and archaeology would be interested in his work, in 1978 Litherland presented his results to the U of T geology department. During the talk it began to dawn on Strangway and Rucklidge (a specialist in instruments for geological analysis) that atom counting could solve major problems in geological analysis and open up exciting new areas of research. Enthusiastic collaboration began almost immediately.

"The credit for this project is in conceiving that it could be done," says Tom Clark, director of the Office of Research Administration, "and also in simply managing it into being. That's where the special genius of Strangway matches the genius of Litherland." Strangway, U of T's new provost, submitted one grant proposal to the Natural Sciences and Engineering Research Council (NSERC) for \$780,000 for equipment, and another to the federal Department of Supply and Services (DSS) for \$372,000 for development. Both proposals have been accepted and preliminary work for the project is now underway.

When TRACE arrives, its first year will be devoted to carbon-14 dating, and

archaeologists are already lining up to use it. Because the machine utilizes all carbon-14 atoms in a sample, not just the few that happen to be emitting beta rays (electrons), it has significant advantages over the conventional method developed by Willard Libby in 1947. While the Libby method requires a hefty chunk of material, TRACE will be able to analyze a sample the size of a dust speck. Thus, many archaeological specimens too small and/or too precious to be used for the conventional method can at last be dated. And it's faster. The "black box" will accomplish in 10 minutes what conventional dating might take three months to do. Finally, TRACE's phenomenally increased sensitivity will extend the useful limit of carbon-14 dating from the present 50,000 years to about 100,000.

Irving, one of the initial collaborators, has a vested interest in TRACE's success. For several years he has been holding on to a rare find from the Yukon: part of a child's jawbone, complete with tooth. It is the only human Pleistocene specimen from northwestern Canada and Alaska, and, when dated, could yield new and surprising information about the length of time man has been living on this continent. "The central problem," Irving explains, "is that we just don't know when *Homo sapiens sapiens* arrived in North America. Some archaeologists maintain that he got here only 12 or 13,000 years ago. Our investigations suggest that he came at least 30,000 years ago." Since bones are difficult to date by the Libby method, and a quarter to half a pound would have to be ground up, Irving prefers to keep his specimen intact and his suppositions unverified until TRACE arrives.

Because the Yukon find is one of many important specimens to be dated, TRACE's first year will undoubtedly be an exciting one, allowing long-awaited breakthroughs in archaeology and paleontology. In carbon-14 dating by atom counting, however, the U of T will not be unique. Oxford and the University of Arizona have also ordered tandem accelerators and Litherland reports collaboration with these teams in instrument design. In addition, groups at Grenoble and at Berkeley are experimenting with cyclotrons for carbon dating and there have been reports of some carbon-14 work at McMaster and other laboratories.

What is unique about the U of T project, and what will strengthen this university's position as "a station on the international railroad" as Clark puts it,

is that the carbon-14 work is only the beginning — it will serve as a test bed for developing the machine's potential to analyze for all trace elements. The second and third years will be of interest primarily, but not exclusively, to geologists and to government departments like Energy, Mines and Resources and Environment Canada, both of which are helping to fund the project through DSS.

"In a geological sample," Rucklidge explains, "you've got a little bit of everything and quite a lot of some!" What comes out of an analysis in a conventional mass spectrograph is a bewildering collection of peaks; a few define discrete isotopes, but most represent different isotopes and molecules of the same weight. TRACE's main attraction for geologists is that it can unscramble this information: the accelerator will eliminate the molecules from the picture, and other methods of separating atoms of the same weight can be devised through experimenting with the machine. (Litherland's negative ion approach does not appear to work with all pairs.) Secondly, due to the minute sample sizes TRACE can handle (the goal in this phase is one micron), it will be able to scan a rock slice from grain to grain, following the movements of trace elements at the microscopic level. This will enable geologists to understand processes that are virtually inaccessible now.

A few examples of the projects geologists and physicists have planned for TRACE illustrate its range of practical applications.

The formation of mineral deposits will be studied by means of rare (and non-radioactive) isotopes like platinum-194, both by measuring their abundances throughout a site and by surface scanning. "We're interested not so much in the platinum itself," Rucklidge emphasizes, "but in using it as a model to understand how elements migrate to form mineral deposits." This work has obvious practical value, which is why Energy, Mines and Resources is so interested.

The search for safe disposal sites for nuclear wastes and hazardous chemicals will be greatly aided by analyses for chlorine-36 and beryllium-10 in deep portions of the Canadian Shield. These two radioactive isotopes, both with half-lives of millions of years, are (like carbon-14) being created continually by cosmic ray bombardment in the atmosphere. They filter down to the earth and enter the water exposed at the surface. By counting the atoms of chlorine-36 and beryllium-

Continued on Page 4

10 in water trapped in the pore spaces of subsurface rocks, geologists will be able to date the water — to tell for how long the rock has not had fluids moving through it. "We're looking at a scale of about 10 million years," explains Strangway. "If an area has been stable that long, it's a pretty safe bet it isn't going to move for another million years. That area would be safe for the disposal of hazardous materials."

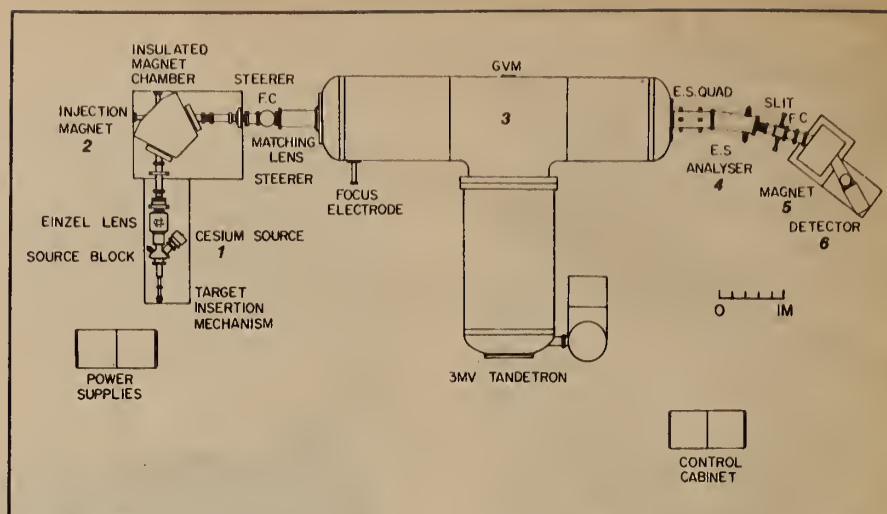
Even water pollution can be documented, by probing the annual growth rings of certain shells for trace elements like vanadium and by analyzing core samples of ice caps which provide yearly records of water compositions going back several hundred years. Environment Canada is committed to this work, and to the chlorine and beryllium project.

The applications of TRACE to medical research are also being explored, particularly in the use of radioactive materials as metabolic tracers. By counting atoms rather than beta rays, the amount of radioactive material used in these tests can be dramatically reduced.

The isotopes that geologists become most animated about are the esoteric pair samarium and neodymium. Like other heavier radioactive isotopes, samarium-147 forms not by cosmic ray bombardment but by an enormous nuclear explosion — the "big bang" that created the solar system — and decays by emitting alpha particles (two protons plus two neutrons). Some alpha decays (uranium to lead, thorium to lead, etc.) can be used successfully for relative dating by compli-

cated chemical extraction procedures. Samarium, however, because of its half-life of billions of years is, from our vantage point, just beginning to decay; there's very little of the "daughter", neodymium-143, around. According to Rucklidge: "The change in the ratio of samarium to neodymium is about 0.4 percent for the whole of geological time. In order to make this measurement, you have to have an instrument of incredibly high precision." This is why the Sm-Nd analysis is considered the ultimate test for TRACE, and why it will be the final stage of the project.

There is great value in the samarium-neodymium work, aside from stretching the capabilities of the machine. Sm-Nd is one of the few radioactive pairs in which parent and daughter are both highly resistant to changes in temperature and pressure. This means that during volcanism and metamorphism they behave similarly so that a measured ratio will yield the actual time the rock was formed. In other decay pairs, one or both members are often susceptible to metamorphic changes, and escape, so that the date produced only tells the time of the last reshuffling. For this reason, much of the Canadian Shield is still undated and its history is sketchy. What the Sm-Nd analyses will provide is a base line to which the other radioactive "clocks" can be related, giving them meaning in absolute terms. For theoretical geologists this information will solve a great Canadian puzzle, for exploration geologists it will open up new avenues in the search for valuable deposits.



TRACE: (1) Sputter source (Cs^{+2}) eliminates ^{14}N and shoots off negatively charged particles from the sample. (2) Mass spectrometer (injection magnet) selects for mass 14. (3) 18'-long tandem accelerator (3 million volts) breaks up ^{13}CH and $^{12}\text{CH}_2$ by stripping away several electrons. (4) Electrostatic analyzer selects for +3 charge (only ^{14}C) and eliminates molecular fragments. (5) Mass spectrometer (magnet) selects again for mass 14. (6) Atom identifier (detector) verifies ^{14}C and counts. Prof. Litherland comments: "The last three instruments give us confidence that our measurements will be a thousand times more sensitive than the conventional beta-ray method."

Strangway sums up TRACE's importance to his field: "I hope that with this machine we will be able to revolutionize the study of isotopes in natural geological systems. Studying migration paths, age dating, and analyses on spots just a few micrometers in size should give us a great deal of insight into the processes that take place." He feels that many more applications of the machine will be found once work is underway and that spin-offs can benefit Canadian industry.

Since TRACE will apply to so many different areas, careful decisions need to be made about who gets to use the machine when. An allocations committee is being set up for this purpose, composed of members from five academic disciplines (physics, geology, archaeology, materials science and hydrology) and three government representatives.

There are many goals in this project. Most are useful ones; some will be very difficult to achieve. Only one phase — the carbon-14 dating — has been proved to work. Proof of the success of most other phases will have to wait for TRACE's arrival, for there is no other machine in the world on which the ideas can be tested. When asked about the uncertainties in the million-dollar project, Strangway replied: "There are 'risks' in achieving every single limit of every objective that we have stated. But I think there is very little risk in saying that we will be able to make major breakthroughs... I guess if we really knew the answer to that question we wouldn't be doing this work." Indeed, much of the excitement for Litherland, Rucklidge and Strangway lies in discovering — and then extending — the limits of the machine. Tom Clark shares their excitement: "The kinds of research this university should be doing are things that are daring, that are risky, that have a chance for high payoff, that are novel."

And the graduate school is always asking, "Are there opportunities here for graduate students to blow their minds on something that's highly original, rather than going over the same ground?" My assessment is that this is the kind of project we should be into."

One achievement has already been made — a human, rather than a technical one: the collaboration of three different fields in an effort that will benefit many more. Particularly in a time when rosy budgets are memories, cooperation may be necessary to achieve one's goals. And, as the evolution of TRACE illustrates, through working together one's goals and outlook can expand.

How does collaboration come about? Appropriately, Litherland sees it as a natural process of acceleration: "It starts very slowly and picks up speed to a certain critical point beyond which there seems to be no return — you find yourselves in a collaborative venture." Although organized events like symposia can provide an encouraging environment for collaboration, Strangway feels that to some extent it will always happen on a casual, personal basis. "The question," he says, "is whether your mind is open to receive it."

Etkin receives Eadie medal

Professor Bernard Etkin of the Institute for Aerospace Studies was awarded the Thomas W. Eadie Medal of the Royal Society of Canada at its annual meeting, June 1. The medal is awarded for excellence of contributions to Canadian engineering and applied science. The citation made reference to Professor Etkin's work in teaching and administration as well as to his research, publications, and consulting.

Committee Highlights

At its meeting June 17, the Campus & Community Affairs Committee

- recommended for approval in principle the presidential memo concerning academic development and private funding (details to be published in the *Bulletin* in the fall)
- endorsed a draft agreement between the University and the city providing for the use of University property as a link in a city bicycle route (see page 1)

At its meeting June 18, the Business Affairs Committee

- gave formal approval to the vice-president — business affairs for estab-

lishment of an appropriation of \$50,000 for preliminary design fees for the proposed library for Scarborough College. The estimated cost of the project is \$2,699,832

- approved city bicycle route as recommended by Campus & Community Affairs
- approved an augmentation to pensioners of 6.5 percent
- recommended for approval biohazard containment facilities on the fourth floor of the Medical Sciences Building, at an estimated cost of \$395,609

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Connaught Fund research programs

The Connaught Committee has awarded 20 research grants resulting from the January competition. Seventeen awards are for research grants to faculty already established at the University, while the remaining three awards are to new staff members who are in their first two years of appointment at the University.

Recipients of the Connaught awards are:

Professor J.M. Bliss, Department of History, "History of the Discovery of Insulin";
 Professors I.R. Brown and J.W. Gurd, Division of Life Sciences, Scarborough College, "Protein Synthesis in the Mammalian Visual System: Effects of LSD and Elevated Body Temperature";
 Professor I.H. Campbell, Division of Earth and Planetary Sciences, Erindale College, "Simultaneous Determination of Fe and Ni Activity Coefficients in Silicate Liquids";
 Professor V.L. Chan, Department of Microbiology and Parasitology, "Genetics of Somatic Cells and Herpesvirus";
 Professors Eric Fawcett, J.M. Daniels, J.M. Perz and M.B. Walker, Department of Physics, "Three Dimensional Incommensurate Systems: Chromium and Its Dilute Alloys, and MnSi";
 Professor M.C. Ganoza, Banting and Best Department of Medical Research, "Site Specific Mutagenesis — A Probe to Study the Nucleotide Sequences that Regulate Initiation of Protein Synthesis";
 Professor A.K. Grayson, Department of Near Eastern Studies, "The Royal Inscriptions of Mesopotamia";
 Professor Andrew Hughes, Faculty of Music, "Transcription and Computer-Coding of Medieval Plainsongs";
 Professor G.A. Kenney-Wallace, Department of Chemistry, "Picosecond Chemical Dynamics in Liquids";
 Professor R.H. Kluger, Department of Chemistry, "Reactivity of Intermediates in Thiamin Catalysis";
 Professor C.M. MacLeod, Division of Life Sciences, Scarborough College, "Savings for Pictorial Information in Long-Term Memory";
 Professors A.D. May and Nathan Isgur, Department of Physics, "Double Polarization Lasers";
 Professors N.H. McKee and R.T. Manktelow, Department of Surgery, "The Effect of Hemodynamic Abnormalities on the Survival of Free Flaps";
 Professor J.A. Packer, Department of Civil Engineering, "The Behaviour and Design of Rectangular Hollow Section Connections in Structural Steelwork";
 Professor R.C. Plowright, Department of Zoology, "The Sociobiology of Bumble Bees";
 Professors R.R. Reisz and W.G. Pearce, Erindale College, and P.H. von Bitter, Department of Geology and Royal Ontario Museum, "Paleontology, Sedimentology and Paleocology of the Late Pennsylvanian Rock Lake Shale Deposits near Garnett, Kansas";
 Professor J.C. Ritchie, Department of Botany and Scarborough College, "Late-Quaternary Environments of the Maghreb";
 Professor I.W.J. Still, Department of Chemistry and Erindale College, "Synthetic Transformations and Photochemical Behaviour of Organic Sulfur Compounds";
 Professor S.C. Wallace, Department of Chemistry, "Nonlinear Laser Spectroscopy in Supersonic Jets";
 Professor M.A. Winnik, Department of Chemistry, "New Fluorescent Probes of Polymer Dynamics in Solution and Applications to High Polymers".

The awards to senior faculty are the last to be given under the research grants program, which has now been discontinued and replaced by Connaught special research program grants. The new staff program will continue in its present

form. The senior fellowships program has recently been expanded to encompass the social sciences as well as the humanities.

Connaught Special Research Programs

The specific purpose of these grants is to support the research of individuals or groups of scholars in the University who have a record of outstanding achievement and a continuing potential for important research, so as to enable them to produce results of major significance within a period of up to five years. The grants are designed to bring about a concentration of support in areas of research at the University that are especially outstanding. The object of this concentration is to ensure that, in a period of restricted funding from government, the University will be able to respond significantly to the needs of some of its most eminent scholars. Applicants may come from any field. Grants will be made in accordance with the most exacting standards of extensive external peer review, and will be awarded for periods of up to five years and may extend support in excess of \$100,000 per annum. It is intended that, in the steady state, approximately two awards will be given each year and that approximately one-half of the annual expenditures of the Connaught Fund will be made for the special program grants.

Support may be provided for all types of expense normally associated with research, including expenses for research assistants and associates, non-tenure-stream academic appointments, and purchases of supplies and equipment, or any combination of these categories of expenditure. Funds may not be used to supplement salaries, but in special circumstances may be used to relieve staff members of normal teaching duties by providing for some released time.

The deadline date for applications is September 12. Further information and application forms may be obtained from the Office of Research Administration, 978-6475.

Connaught Senior Fellowships in the Humanities and Social Sciences

The senior fellowships in the humanities program, begun in 1977, has proven so effective that it has now been expanded to the social sciences as well. The program is designed to support individual research and scholarship by providing assistance to individual scholars working independently. It is not designed to support a person who is currently a part of a larger team or who requires team assistance to carry out the research project envisaged. The fellowship is offered in order to provide an individual with released time which would not normally be available. It is not intended to furnish support for an already scheduled research leave period for which salary support already exists or to be a salary supplement. The fellowships are viewed very much as a reward for past academic achievement and as a means by which U of T scholars of proven excellence can be assisted to further achievement. Fellows are selected on the basis of retrospective recognition of proven ability and achievement and a distinguished record in research and scholarship.

During this first year of the expanded program, up to six fellowships may be awarded, with up to four in the humanities (as in the past humanities program) and a maximum of two in the social sciences.

The deadline date for application for the 1981-82 year is November 15, 1980. Further information and application forms may be obtained from the Office of Research Administration, 978-6475.

Research News

Alexander von Humboldt Foundation Research Fellowships

The purpose of the foundation is to award research fellowships to young, academically trained and highly qualified persons of foreign nationality to enable them to carry out research projects in the Federal Republic of Germany, and to maintain academic contacts resulting therefrom. The fellowships are awarded to foreign scholars who work at universities or other research institutes and who have already demonstrated their ability in independent scientific research, in order to provide an opportunity to carry out a specific research project at an institute in the Federal Republic of Germany and Berlin (West). Sponsorship is provided on a long-term basis and usually covers a period of six to 12 months, though no longer than 24 months. Applications may be submitted at any time of the year. For further information, contact ORA at 978-2163.

In addition to the above-noted regular fellowship program, the foundation administers a number of special programs which are wide ranging. For further information, contact ORA at 978-2163.

U of T Pure & Applied Sciences Committee of the Research Board

The committee has instituted a small grants competition for awards between \$5,000 and \$20,000. Funds may be requested for:

- (a) seed money to start a new imaginative and daring research project;
- (b) for necessary equipment;
- (c) for the support of personnel.

Applications will be judged by a small peer committee and awards will be made on the bases of the scientific merits of the applicant and the proposed research, the urgency of need, and, when equipment is requested, its general usefulness.

Applications should be submitted in writing to the "Pure and Applied Sciences Research Awards Committee," c/o the Office of Research Administration, and should include a brief description of the proposed research including comments on what is considered to be its particular merit, significance and/or relevance. The application should include a budget, and a curriculum vitae for each principal investigator (on NSERC form 100).

For this initial year, there will be two competition deadline dates, August 15 and November 30, with total amounts of between \$25,000 and \$40,000 to be awarded in each competition. For further information, contact ORA at 978-2163.

Health & Welfare Canada — Health Promotion Directorate

The agency has established one deadline only for both new and renewal applications, July 31. For new grants the start date of an award will be on or after April 1. For renewal grants the start date will be January 1 or April 1.

The agency has also promised that new guide booklets will be available soon.

Upcoming Deadline Dates

Connaught Fund new staff grants: August 1.

Connaught Fund special research program grants: September 12. Please note that this is a new program and that the research grants program of the Connaught Fund has been discontinued. Call 978-6475 for further information.

The Underground Railroad Soul Food Restaurant



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Events

Meetings & Conferences

Monday, July 14

Research to Practice: Past, Present and Future.

One-day seminar. Featured guest, Dr. Peter Mittler, Hester Adrian Research Centre for the Study of Learning Processes in the Mentally Handicapped, Manchester. Debates Room, Hart House.

Information, 978-8606 or 923-6641, ext. 493.

(Behavioural Science and National Institute on Mental Retardation)

Sunday, August 17

ICTAM Toronto.

XVth International Congress of Theoretical and Applied Mechanics will be held Aug. 17 to 23 on the St. George campus. Organized by the National Research Council, Canadian Society for Mechanical Engineering and U of T and held under the auspices of the International

Union of Theoretical & Applied Mechanics.

Registration fee, which includes lunch and refreshments on each day of the congress, \$125.

Information: Prof. F.P.J. Rimrott, Department of Mechanical Engineering, 978-3053.

Seminar

Friday, July 18

Use of Chromosomal Abnormalities to Understand Segregation during Meiosis in the Mouse.

Dr. Peter de Boer, Wageningen, The Netherlands. 417 Best Institute. 12.30 p.m.

(BDDMR)

Play

Wednesday, July 23

Saved.

By Edward Bond, directed by William Lane, produced by the Young Company. Previewing July 23, opening July 24, playing Monday to Saturday to August 9. Glen Morris Studio Theatre. All performances at 8 p.m.

Tickets \$3, preview pay-what-you-can. Information and reservations, 978-8705. (Drama Centre and Student Youth Employment Program, Theatre Ontario, Experience 80 and Ontario Youththeatre)

Miscellany

Tuesday, July 22

Californian Wine Tasting.

Learn about Californian wines. Woodsworth College lounge. 5.30 p.m.

Tickets \$3. Number of places limited, tickets must be obtained in advance from Woodsworth College; room 106 from 9 a.m. to 4.30 p.m., information office from 4.30 to 7 p.m.

Information, 978-4444.

(Woodsworth College, WCSA and APUS)

Concerts

Tuesday, July 15

Summer School — 1980.

Two series of concerts are being given Tuesdays and Wednesdays to Aug. 5 and 6 in conjunction with summer school of Royal Conservatory of Music; presented in cooperation with CBC.

All concerts will be in Walter Hall, Edward Johnson Building. Information, 978-3771.

Tuesday, July 15

Earle Moss.

Piano. 5.15 p.m.

Wednesday, July 16

Michael Kearns.

Harpichord and organ. 8.15 p.m.

Tuesday, July 22

Brenda Baranga and Deborah Piotrowski.

Piano four hands. 5.15 p.m.

Wednesday, July 23

Nancy Mathis, Paul Pulford and William Aide.

Violin, cello and piano. 8.15 p.m.

Tuesday, July 29

Wes Wraggett.

Electronic music. 5.15 p.m.

Wednesday, July 30

Antonin Kubalek.

Piano. 8.15 p.m.

Tuesday, August 5

Paul Massel.

Baritone. 5.15 p.m.

Wednesday, August 6

McMaster String Quartet.

8.15 p.m.

Wednesday, July 16

Joni Pulliam, Cello and Lydia Wong, Piano.

Second of five in summer lunchtime series. Innis College Town Hall.

12.30 p.m. Information, 978-7023.

(Innis and Woodsworth)

Thursday, July 17

Cantabile.

A capella choir from Ghent will give concert of Renaissance and romantic music. Trinity College Chapel. 8 p.m.

Donations at door.

(Hart House Chorus)

Sunday, July 20

Carillon Recital.

Andrea McCrady, formerly Oratoire St-Joseph, Montreal; third in series of seven. Soldiers' Tower. 7.30 to 8.30 p.m.

(UTAA)

Wednesday, July 23

Daniel Neff, Baritone and Bruce Ubukata, Piano.

Third of five in summer lunchtime series. Innis College Town Hall. 12.30 p.m.

Information, 978-7023.

(Innis and Woodsworth)

Sunday, July 27

Carillon Recital.

Janet Dundore, St. Thomas' Church, Whitmarsh, Pa.; fourth in series of seven. Soldiers' Tower. 7.30 to 8.30 p.m. (UTAA)

Wednesday, July 30

Louise Hanly, Flute and Deirdre Reynolds, Piano.

Fourth of five in summer lunchtime series. Innis College Town Hall.

12.30 p.m. Information, 978-7023.

(Innis and Woodsworth)

Hart House Chorus Bon Voyage.

Benefit concert for tour of Great Britain. Great Hall, Hart House. 8 p.m.

Tickets \$5, students and senior citizens \$2.50; available from Hart House Programme Office. Cheques should be made payable to Hart House.

One free ticket in reserved section and invitation to reception following concert will be issued to each person who donates \$30 (sponsor) or \$15 (patron) to the tour fund. Donation cheques should be made payable to Varsity Fund-Hart House Chorus and sent to Programme Office. Receipts for income tax purposes will be issued.

Note: Please enclose stamped, self-addressed envelope for all ticket orders and donations.

Information, 978-5361.

Sunday, August 3

Carillon Recital.

Beverly Buchanan, Christ Church, Cranbrook, Bloomfield Hills, Mich.; fifth in series of seven. Soldiers' Tower. 7.30 to 8.30 p.m.

(UTAA)

Wednesday, August 6

Janet Rooks, Piano.

Last of five in summer lunchtime series. Innis College Town Hall. 12.30 p.m.

Information, 978-7023.

(Innis and Woodsworth)

Sunday, August 10

Carillon Recital.

James B. Slater, Metropolitan United Church, Toronto; sixth in series of seven. Soldiers' Tower. 7.30 to 8.30 p.m.

(UTAA)

Exhibition

Monday, July 14

Saved from the Dust-Bin.

Canadian ephemeral material; 1980 has been designated World Ephemera Year. Thomas Fisher Rare Book Library to mid-August.

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Stuttering: The handicap that afflicts thousands of Canadians

has a poor 'cure' rate. Two speech pathologists may improve the odds.

by Pamela Cornell

The screen door bangs shut and the three-year-old boy rushes into the kitchen where his father is clearing away the breakfast dishes.

"D-d-d-daddy, th-th-there's a b-b-b-big red fire-fire-truck over at T-t-tim's house. Come and s-s-s-see!"

"Don't get so excited, David," chides his father. "Slow down and say it again. 'Daddy, there's a big red fire truck over at Tim's house.' Now, let me hear you say it properly."

Ironically, that well-intentioned admonishment could push young David towards a lifelong stuttering problem — a social and occupational handicap that affects about one percent of the population.

For stutterers, being a fluent speaker is like being a high jumper. It requires unflagging work and dedication. Any letup, and the skills slip.

Toronto's speech pathology clinics are overflowing with stutterers but the long-term success rate is not high. About 80 percent of those "cured" revert to their old ways within a couple of years, despite having undergone lengthy treatment.

Hoping to decrease the time and increase the effectiveness of treatment, speech pathologists Bernard O'Keefe (Department of Rehabilitation Medicine) and Robert Kroll (Clarke Institute of Psychiatry) have launched a one-year research project, assisted by a \$7,000 Laidlaw Foundation grant.

The purpose of the investigation is to evolve a set of standardized procedures for teaching stutterers to analyze the intricacies of their own speech patterns. To do so, they will listen to taped samples slowed down to two-thirds the normal rate but maintained at normal pitch by a small computer. They call their method "speech expansion".

"Stuttering used to be seen as symptomatic of an underlying psychological problem," says Professor O'Keefe, "so therapy attempted to uncover and deal with the 'neurosis' rather than to directly

manipulate speech. The approach was not effective."

Within the past 20 years, however, research has led to the current view of stuttering as a learned behaviour which can be modified to smoother, more acceptable sounding patterns.

Stuttering is not uncommon among very young children, though most outgrow it. Just as they stumble and take spills when they're running, so they're likely to experience the equivalent when they talk too quickly.

Learning language and speech simultaneously isn't easy, especially when neurological development is incomplete. Boys are slower than girls to develop neurologically, which could have something to do with the ratio of male to female stutterers being three to one.

If demands are made on a child to speak better than he can, he might develop a speech hesitancy. Then, as he gets older and more self-conscious, speech mannerisms tend to multiply.

In attempting to postpone his tendency to repeat the first letter of a word — as in "my m-m-m-mother" — a stutterer might repeat the preceding word — as in "my-my-my-my m-m-m-mother." He might also interject something between the troublesome words — as in "my-my-my-my aaaaah m-m-m-mother."

Visual mannerisms can develop, too. Seeing an embarrassed look on a listener's face might cause the stutterer to make a habit of shutting his eyes, blinking rapidly, or glancing repeatedly off to one side.

"Most stutterers come from success-oriented, upwardly-mobile families," says O'Keefe. "Of course, that's the great Canadian tradition. But while most of us grew up in just such a setting, few of us end up as stutterers. Twins raised in the same environment can grow up with one being a stutterer, the other not. It could be that there's some kind of organic predisposition. No one knows."

In 1972, two researchers analyzed

sound/motion pictures of the "moment of stuttering". They identified 46 different visible and audible dysfluency behaviours.

The initial and most important phase of stuttering treatment is accurately identifying and describing deviant speech behaviours before going on to modification procedures.

"It has been well-documented that humans can better learn to change their behaviour if they have a fuller understanding of what it is they're doing," says O'Keefe.

"Unfortunately, such analyses are seldom completed in everyday practice because no practical and reliable clinical procedure has been developed. As it is, clinicians have to play tapes over and over again to arrive at even a reasonably accurate assessment."

O'Keefe and Kroll have already tested their speech-expansion approach on a group of clinicians, who were asked to perform two analyses of one speech sample — first played at normal speed, then at two-thirds the normal rate.

"Trying to analyze the normal-speed sample on a single run-through had them tearing their hair," says O'Keefe, adding that the results were poor. Whereas the analyses of the slowed-down samples were far more accurate and detailed. Moreover, after a 30- to 60-minute training period, the clinicians performed even better.

The current project will involve a total of 40 subjects — all at least 16 years old, all able to read at the grade eight level, all with normal hearing, and all untrained in the analysis of stuttering behaviours. Their moments of stuttering must equal at least 10 percent of emitted words and they must show at least three specific dysfluency form-types.

Three of those form-types have already been described — partial word repetition (m-m-m-mother), whole word repetition (my-my-my-my), and interjections (aaah, ummm, etc.).

There's also prolongation, where the stutterer gets stuck on one syllable; and its counterpart, the silent block, where the stutterer tries to articulate the next word but no sound comes out.

Some stutterers over-emphasize the beginnings of words (hard onsets) while others are so anxious to avoid certain words, they'll substitute others (circumlocution), often resulting in wildly convoluted discourse.

Stutterers participating in the Kroll-O'Keefe study will each record a three-minute, spontaneous speech sample, then listen to it at two-thirds the normal speed. They will then be excused while a qualified speech clinician examines each sample.

When the subjects return, they will be taught the specific dysfluency form-types isolated during analysis. Following training, the subjects will listen to their own time-expanded speech samples three times, each time noting their analysis on forms provided.

"Under current treatment methods, stutterers can be conditioned to be fluent without really understanding the process," says O'Keefe, "but we hope the individual will be less likely to lose his skills when he can be his own clinician."

A speech expander suitable for clinical use would retail at about \$350 — a small and worthwhile investment if it can cut health care costs by knocking eight to 12 hours off an individual's treatment time.

Should the speech-expansion project prove successful in providing stutterers with the skills to analyze their own dysfluency, O'Keefe wants to conduct a similar investigation using sound/video tape so stutterers can analyze visual as well as aural factors.



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THE PRESS

COU establishes committee for health sciences

At its final meeting for the academic year on June 20, the Council of Ontario Universities (COU)

- approved the establishment of a Liaison Committee of Health Sciences as an affiliate of COU. The committee will continue the work of the informal Health Sciences Group to provide a focus for the discussion of major issues affecting university health sciences education and a mechanism for bringing these to the attention of the Ministers of Health and Colleges and Universities
- approved the annual report of the Ontario Council on Graduate Studies for transmittal to the Ontario Council on University Affairs. As well as containing a status report on discipline assessments, it lists new graduate programs proposed

in the five-year plans, recommends six programs for funding, and provides graduate student enrolments and doctoral program data

- received a report on undergraduate planning from the Committee on Long-Range Planning. The report takes the form of a discussion paper and will be circulated to all deans responsible for undergraduate programs, inviting their comments in the autumn. As well, the vice-presidents (academic) of member institutions will be asked to investigate the feasibility of regularly exchanging information on the introduction of new undergraduate programs, and the withdrawal or major modification of existing programs

Occupational Health and Safety Coordinator

The Vice-President — Campus and Community Affairs is interested in making an interim appointment to the new position of Occupational Health and Safety Coordinator. This appointment preferably will be on a part-time cross-appointed basis for a member of the academic staff knowledgeable in the Health and Safety field, experienced in administration and familiar with University of Toronto operations. During the initial stages, this person will assist the Vice-President to develop the committee structure, educational programs and specialist resource support needed to comply with the requirements of the Occupational Health and Safety Act (Bill 70).

Enquiries or nominations should be directed to Dr. William E. Alexander, Room 115, Simcoe Hall, 978-2757.

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July 27 **Herb Marshall Group**
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Aug. 10 **Jim Galloway Group**

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July 17-19
Gerry Mulligan Quintet
Aug. 4-9
Betty (Be-Bop) Carter and her Trio
Aug. 11-16
Keith Blackley and Michael Stuart

PhD Orals

Since it is sometimes necessary to change the date or time of an oral examination, please confirm the information given in these listings with the PhD oral office, telephone 978-5258.

Thursday, July 17

Joshua Cohen, Department of Educational Theory, "The Theory of Interjection Emergence: A Theory of Creativity, Culture, Mind and Brain." Prof. D. Burrill. Room 111, 63 St. George St., 10 a.m.

Friday, July 18

Awak Anam, Department of Educational Theory, "The Systematic Planning of Educational Facilities: A Case Study of the Cross River State of Nigeria." Prof. D. Wilson. Room 111, 63 St. George St., 10 a.m.

Monday, July 21

Katabaro Miti, Department of Political Economy, "Socialism or Nationalism: The Debate about the Arusha Declaration Era in Tanzania." Prof. J.S. Barker. Room 111, 63 St. George St., 10 a.m.

John Courtney Saxby, Department of Political Economy, "The Politics of Education in Zambia." Prof. J.S. Barker. Room 111, 63 St. George St., 2 p.m.

Thursday, July 24

Reinhold W. Veith, Department of Physiology, "Metabolism of 25-Hydroxyvitamin D in Mammals." Prof. D. Fraser. Room 307, 63 St. George St., 2 p.m.

Wayne Mervin Loucks, Department of Electrical Engineering, "Fermion: A Flexible Extendible Range Multiprocessor." Prof. Z.G. Vranesic. Room 309, 63 St. George St., 2 p.m.

Friday, July 25

Donald R. Atkinson, Department of Educational Theory, "Understanding Poverty." Prof. I. Winchester. Room 111, 63 St. George St., 10 a.m.

Monday, July 28

William McKellin, Department of Anthropology, "Kinship Ideology and Language Use among the Managalse of the Papua New Guinea." Prof. D.H. Turner. Room 309, 63 St. George St., 10 a.m.

Donald Michael Fuchs, Faculty of Social Work, "Determinants of the Use of a Teenage Clinic in a Metropolitan Hospital." Prof. J. Gandy. Room 111, 63 St. George St., 10 a.m.

Jorge Gilbert, Department of Educational Theory, "Cuba: From Primitive Accumulation of Capital to Socialism." Prof. D. Livingstone. Room 309, 63 St. George St., 2 p.m.

Wednesday, July 30

Marlene L. Jones Colbourn, Department of Computer Science, "Cyclic Block Designs: Computational Aspects of Their Construction and Analysis." Prof. R. Mathon. Room 309, 63 St. George St., 10 a.m.

Wednesday, August 6

Mingche Yeh, Department of Educational Theory, "Canadian vs. Chinese Cross-Cultural Developmental Study of Moral Judgment." Prof. P. Gamlin. Room 111, 63 St. George St., 2 p.m.

Friday, August 8

Stephen Tyman, Department of Philosophy, "Heidegger and the Proto-Ethical Motive for Overcoming the Ambiguity in Metaphysics." Prof. T.D. Langan. Room 111, 63 St. George St., 2 p.m.

Job Openings

Below is a partial list of job openings at the University. Interested applicants should read the Promotional Opportunity postings on their staff bulletin boards, or telephone the Personnel Office for further information. The number in brackets following the name of the department in the list indicates the personnel officer responsible. Please call: (1) Sylvia Holland, 978-6470; (2) Margaret Graham, 978-5468; (3) Manfred Wewers, 978-4834; (4) Ann Sarsfield, 978-2112; (5) Barbara Marshall, 978-4518; (6) Clive Pyne, 978-4419.

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(\$17,700 — 20,820 — 23,940)
Astronomy (1)

Gardener-Grower

(Union classification, \$8.03 per hour)
Physical Plant (6)

Photographer III

(\$15,090 — 17,750 — 20,410)
Architecture (1)

Information Officer

(\$15,940 — 18,760 — 21,580)
Scarborough College (4)

Coordinator of Continuing Studies

(\$15,940 — 18,760 — 21,580)
Erindale College (4)

Coordinator of Program Development

(\$24,160 — 28,420 — 32,680)
Social Work (4)

Classified

A classified ad costs \$5 for up to 35 words and \$.25 for each additional word. Your name counts as one word as does your phone number, but the components of your address will each be counted as a word.

A cheque or money order payable to *University of Toronto* must accompany your ad.

Ads must be submitted in writing, 10 days before *Bulletin* publication date, to Marion de Courcy-Ireland, Information Services, 45 Willcocks St. Ads will not be accepted over the phone.

Wanted to Rent: Visiting German Professor requires furnished house for family with 2 young children, September 1st 1980-August 1981. Residence should be close to University, preferably on T.T.C. Route. Please call Sandy Giles, Centre for International Studies, 978-3350/6498.

House for Rent near U of T: 3 storey Victorian on Markham St. Completely renovated: 5 bedrooms, 2½ baths, gourmet kitchen, library, sauna & upstairs laundry. One year occupancy from Sept. 1, 1980. Call 929-0538, evenings.

Lakefront cottage/Hastings Madawaska 3 bedrooms, knotty pine interior, 950 sq. ft. Secluded 1 acre lot adjacent to Crown land. Cedar stripe boat 40 hp motor. Year round road. 10% due 1983. \$29,500. 274-5167 eve.

100 acre retreat. 90 miles N. U of T, 2 miles Kirkfield Liftlocks. Trees, pasture, pond, garden. 40 ft. trailer, generator. Total privacy. \$34,900 firm, good terms. 978-3632 or 297-2182.

For Sale. One 1972 Austin Mini being sold as parts must go in one piece. Call 533-2558 after 5 p.m. Ask for Frank Deak.

Scientific artist - Have vast experience in Styling and Drawings of Zoology, Entomology and Botany. For quality job on piece basis contact Aquila Kasamali (416) 425-0686.

Transferred to USA, private sale: modern 3-bedroom townhome, safe neighbourhood, walking distance to campus, 5 appliances, cable, private yard, indoor parking, occupancy to suit. 531-9807 or 978-8589 (day).

Expert Typing — University/Hospital Secretary. Fast, accurate typing. IBM Correcting Selectric (Essays, letters, theses, manuscripts, etc.) \$1.25/page. Phone: Pat 769-0919.

Scuba Dive. It's better with a Club. Weekend and day trips; reliable dive buddies; instruction; pool; socials; boating; camping. For more details contact Pat Flinders, 130 Rosedale Valley Road #709, Toronto. 869-1631 (office) 967-1432 (home).

Convenient to Scarborough College. Large two-bedroom luxury furnished apartment in village of Pickering for rent September-May (approximately). Adjoins conservation area, indoor pool, gym, squash, tennis, etc. \$525/month inclusive. Call 686-2029 or 284-3109.

Furnished country home in Sunny Brae, Nova Scotia in lovely village atmosphere, 100 miles north of Halifax. Rent negotiable. Occupancy September 1, 1980. Superb location for professor on sabbatical leave, writer or somebody who wants to get away from it all. Contact Prof. Jane Evans, 122 Lakeshore Rd., # 46, St. Catharines, Ontario L2N 6N6 Tel. (416) 935-9065.

Learn to sail: Pier 4 Sailing School offers inexpensive lessons for adults and youths at Harbourfront. Taught in centreboard dinghies, the five-day courses run weekly, every Monday from June 9th (morning, afternoon, and evening classes). Rentals available. Have some fun and take in the sun! Phone 366-0390.



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